

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

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Assignee.....Micron Technology, Inc.  
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Examiner .....Zervigon, Rudy  
Attorney's Docket No. ....MI22-1940  
Customer No. ....021567  
Title: Manifold Assembly for Feeding Reactive Precursors to Substrate Processing  
Chambers

**BRIEF OF APPELLANT**

To: MS Appeal Brief - Patents  
Assistant Commissioner for Patents  
Washington, D.C. 20231

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Appellant appeals from the January 9, 2006 Final Office Action rejecting claims 14-21, 31-38 and 45-61. A check is enclosed in the amount of \$500.00 in payment of the fees required under 37 CFR § 41.20(b)(2).

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## **I. REAL PARTY IN INTEREST.**

The real party in interest of this application is Micron Technology, Inc. as evidenced by the assignment of the pending application to such party recorded at reel 012670, frames 0554-0558 on February 28, 2002, in the Assignment Branch of the Patent and Trademark Office.

## **II. RELATED APPEALS AND INTERFERENCES.**

There are no appeals or interferences which will directly affect, be affected by, or have a bearing on the Board's decision in the pending appeal.

## **III. STATUS OF THE CLAIMS.**

Claims 14-21, 31-38 and 45-61 are pending in the application with claims 1-13, 22-38 and 39-44 being previously canceled from the application. Claims 14-21, 31-38 and 45-61 stand finally rejected and are the basis for the present appeal.

## **IV. STATUS OF AMENDMENTS.**

No amendments have been filed in the application subsequent to final rejection.

## **V. SUMMARY OF THE CLAIMED SUBJECT MATTER.**

A concise explanation of the invention defined in the claims that are the subject of the present appeal follows.

The invention pertains to manifold assemblies. Referring initially to Fig. 1, as set forth in claim 14, the manifold assembly has a body 12 with a plenum chamber 14 (page 5, lines 14-15). A first precursor stream 25 is disposed on the body in fluid communication with the plenum chamber at a first precursor inlet 21. A second precursor feed stream 26 is on the body in fluid communication with the plenum chamber at a second precursor inlet 22 (Fig. 1, and the text at page 5, line 20 through page 6, line 4). A purge gas stream 62 is present on assembly body 12 and feeds to a purge gas inlet 60 which is upstream of both the first 21 and second 20 precursor inlets, and is angled from the plenum chamber precursor inlet such that a purge-gas flow provides a venturi effect (Fig. 1; and the text at page 7, lines 15-23; and page 10 lines 5-18). Body 12 additionally has a plenum chamber outlet 68 configured to connect with a substrate processing chamber (page 8, lines 10-14).

Referring to Figs. 1 and 2, as set forth in independent claim 31 a manifold assembly in accordance with the invention can have a body 12 with a plenum chamber 14. A plurality of precursor feed streams 25, 26, 27, 28 are in communication with the plenum chamber at precursor inlets 21, 22, 23, 24, and a purge gas stream 62 is present on the body in fluid communication with the plenum chamber at a purge gas inlet 60. Purge gas inlet 60 is disposed at a first end 18 upstream of the plenum chamber precursor inlets 21, 22, 23, 24, while a plenum chamber outlet 68 is disposed at a second end 20 (Figs. 1 and 2). Structure 70 on body 12 is configured to mount second end 20 to a substrate processing chamber 75 (Fig. 3) with the plenum chamber outlet 68 proximate and connected with a substrate processing chamber inlet.

As set forth in claim 45, a manifold assembly in accordance with the invention can have an elongate body 12 with an elongate plenum chamber 14 (Fig. 1 and the text at page 5 line 15-19). The plenum chamber has a longitudinal access 16, a first and 18 and a second and 20. The plenum chamber has a plurality of precursor inlets 21, 22, 23, 24 received a long longitudinal access 16. Precursor feed streams 25, 26, 27, 28, feed to plenum chamber 14 via inlets 21, 22, 23, 24. The precursor feed streams each have an elongated segment 29, 30, 31 and 32 joining with its precursor inlet and oriented substantially normal to the longitudinal access 16 (Fig. 1; and the text at page 5, line 22 through page 6, line 8). Multi-inlet valves 40, 41, 42, 43 are positioned in respective precursor feed streams 25, 26, 27 and 28 with each multi-inlet valve having at least two valve inlets 47, 49 and at least one valve outlet 51 (Figs. 1 and 2 and the text at page 6 lines 9-17). One of the valve inlets is configured for connection with a precursor source while another of the inlets is configured for connection with a purge gas line (page 6 lines 17-20). A purge gas inlet 60 is disposed at first end 18 and is upstream of all precursor inlets 21, 22, 23 and 24. A purge gas stream 62 feeds purge gas through a single inlet valve 66. Purge gas stream 62 has an elongated segment 64 which joins with the purge gas inlet 60 with the elongated segment being substantially aligned along the longitudinal access 16. Body 12 additionally has a plenum chamber outlet 68 disposed at second longitudinal axis end 20.

## **VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL.**

The grounds of rejection presented for review and position of the Office are concisely stated as follows.

**The rejection of independent claims 14 and 31, and of claims 15-17, 19-21, 32, 34, 37 and 38 which depend correspondingly therefrom, under 35 U.S.C. § 102(a).**

Claims 14-17, 19-21, 31, 32, 34, 37 and 38 stand rejected under 35 U.S.C. § 102(a) as being anticipated by Srivastava (U.S. Patent No. 6,225,745). The Office indicates reliance upon the Srivastava reference as teaching a manifold assembly 12 having a body 10b (Fig. 1b) and indicates that such body inherently comprises a plenum chamber contending that a plenum chamber is inherent since such is "needed to convey gases in 38" (January 9, 2006 Action (henceforth 'Action') at page 2). The Office indicates that any of the upper five feed streams feeding into Srivastava's body 10b qualify as a first precursor feed stream disposed at a first precursor inlet into the plenum chamber, while any other of the first five feed streams qualifies as a second precursor feed stream. The Office indicates that the recited element of a purge gas stream is fulfilled by Srivastava's teaching of a sixth (from the top) gas stream feeding into body 10b (see present action at page 2). The Office contends that this sixth inlet qualifies as being upstream of Srivastava's first and second precursor inlets and as being angled relative to such precursor inlets (present action at pages 2-3). A further contention by the Office is that the Srivastava configuration shown in Fig. 1b provides a venturi effect within the inherent plenum chamber and that such contention is based upon a comparison between the Srivastava body 10b disclosed in Fig. 1b and appellant's body 12 shown in appellant's Fig. 1.

The Office further indicates that the rejection is based upon treatment by the Office of appellant's recited limitations of "precursor inlets", "precursor gases", "purge gases", and

"purge gas inlets" as intended uses rather than structural limitations, and that such recitations are therefore considered by the Office not to limit the scope of the claims (Action at, for example, page 3, relying upon *In re Walter* 618 F.2d at 769, 205 USPQ at 409 and MPEP § 2106).

Srivastava is further relied upon as teaching a plenum chamber outlet configured to connect with the substrate processing chamber with reliance upon Fig. 1b (see Action at the bottom of page 3 with Office's indication that the outlet portion relied upon is not labeled in the relied upon Srivastava figure).

With respect to the specific elements recited in claim 31 the Office indicates that Srivastava further discloses a first end of body 10b with the first end being the bottom of piping 38 shown in Srivastava's Fig. 1b, and an opposing second end which is the top of piping 38 shown in Fig. 1b. The Office states that the Srivastava outlet (not labeled) disposed at the top of piping 38 is configured to connect with substrate processing chamber 16 and that an interface between feature 34 and piping 38 shown in Fig. 1b constitute a structure on body 10b configured to mount the second end of piping 38 to the processing chamber 16 with such outlet being proximate to and connected with substrate processing chamber inlet 34 thereby fulfilling the elements recited in appellant's claim 31 (Action viii).

The Office further indicates reliance upon the Srivastava disclosure as teaching each of the elements recited in dependent claims 15-17, 19-21, 32, 34, 37 and 38.

**The rejection of dependent claims 18, 33, 35 and 36, and of independent claim 45, and claims 46-61 which depend therefrom, under 35 U.S.C. § 103(a).**

Claims 18, 33, 35, 36 and 45-61 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Srivastava in view of Onda (U.S. Patent No. 5,395,482). Srivastava is indicated as being relied upon for features as discussed above with respect to the § 102 rejection of independent claims 14 and 31. At page 8 of the Action, the Office defines Srivastava's longitudinal axis as being the axis "of left-most piping 38" of feature 12 (with reference to Fig. 1b) and that such is substantially vertical, with the sixth from the top gas stream being "on Srivastava's longitudinal axis" (Action at page 9).

With respect to independent claim 45 the Examiner acknowledges that Srivastava fails to disclose or suggest the claim 45 recited combination of features including the claim 45 recited multi-inlet valves and feed streams having elongated segments joining with plenum chamber inlets and indicates reliance upon the Onda disclosure identifying Onda's feature V49 in Fig. 3 as a multi-inlet valve, identifying Onda's features 70/71 of Fig. 2 as precursor feed streams indicating piping or feed gas connections to 70/71 of Fig. 3 as being elongated segments substantially aligned on a longitudinal axis of an inherent plenum chamber (Action at page 17).

Onda is also indicated as being relied upon as disclosing the features recited in appellant's dependent claims 18, 33, 35, 36 and 46-61.

The Office contends that it would be obvious to one of ordinary skill in the art to combine Srivastava's valves and Onda's three-way valve as well as Onda's "flange portion" indicating that motivation for such combination is based upon reducing material costs by combining three valves into one and "for creating a hermetic seal between Srivastava's



body and Srivastava's processing chamber and the exterior environment as taught by Onda" (relying upon Onda at col. 7, ll. 54-61).

## **VII. ARGUMENT.**

**The rejection of independent claims 14 and 31, and corresponding dependent claims 15-17, 19-21, 32, 34 and 37-38 as being anticipated by Srivastava, should be overturned since the relied upon reference fails to teach every element recited in any of those claims.**

Claims 14-17, 19-21, 31-32, 34 and 37-38 stand rejected under 35 U.S.C. § 102(a) as being anticipated by Srivastava (U.S. Patent No. 6,225,745). In accordance with MPEP § 2131, anticipation requires each and every element of a claim to be disclosed in a single prior art reference. Each of claims 14-17, 19-21, 31-32, 34, 37 and 38 are allowable over Srivastava for at least the reason that the reference fails to disclose each and every element in any of those claims.

Independent claim 14 recites a manifold assembly comprising a body having a plenum chamber. Claim 14 additionally recites first and second precursor feed streams on the manifold body at precursor inlets, and a purge gas stream on the manifold body at an inlet which is upstream of the precursor inlets and angled relative to the precursor inlets such that a purge gas flow through the purge gas inlet provides a venturi effect within the plenum chamber relative to the first and second precursor inlets. At page 2 of the Action, the Office indicates that Srivastava inherently discloses a plenum chamber indicating that such is "inherent-needed to convey gases". However, nothing in the Srivastava disclosure

teaches a plenum chamber to support the contention of the Office. Nor has the Office provided support for the contention of inherency.

The Examiner has been repeatedly encouraged to review the Board of Patent Appeals and Interferences decision in Appeal Number 03-0877 regarding Patent Application Serial No. 09/601,884. In such decision, the Appeal Board found Examiner error where the Examiner failed to provide evidence that a channel disclosed in a reference could be defined to include a plenum chamber. The Office's present reliance upon Srivastava as showing a plenum chamber is similarly unsupported and rejection based upon such contention is accordingly unfounded.

In Appellant's response filed October 24, 2005, appellant requested direction to appropriate support for the Office's position regarding the inherency of a plenum chamber to allow appellant to fully address the issue. In maintaining the rejection and the position on inherency of a plenum chamber, the Office set forth at the bottom of page 21 of the Action, a definition of "plenum" and indicated that the Srivastava disclosure of a pipe conveying gases inherently discloses a plenum chamber since such "is full of "matter"". However, the present claims do not recite "plenum" in isolation. Rather, the claims specifically recite a plenum chamber. As found by the Board of Patent Appeals and Interferences (Appeal Number 03-0877) mere disclosure of a channel in a reference was insufficient for defining such to include a plenum chamber where the Examiner failed to provide additional evidence. Accordingly, the Srivastava disclosure does not support the Office's rejection.

Appellant further notes that the interpretation given by the Office of the device depicted in Fig. 1b of Srivastava is contrary to the Srivastava description of such device, thereby rendering the present rejection unclear and unsupported by the relied upon

reference. Referring to the Action at page 2, for example, the Office indicates that "Srivastava teaches a reactive precursor feeding manifold assembly (12; Figure 1b; column 3; lines 20-44), comprising; a body (10b; Figure 1b; column 3; lines 20-44) comprising a plenum chamber (inherent-needed to convey gases in 38); a first precursor feed stream (any of the first five, from top to bottom, gas streams feeding into Srivastava's body) on the body (10b; Figure 1b; column 3; lines 20-44) . . . " In observing the referenced Fig. 1b, and reviewing the cited text at column 3, lines 20-44, it is clear that feature 10b, identified by Srivastava as the asher device, (col. 3, ll 10-11) includes feature 12 (identified as a gas box (col 3, ll 12). Accordingly, feature 12 cannot comprise feature 10b as interpreted by the Office. Further, nothing in the Office's statement identifies what portion of "body 10b" is being held by the Office to be the inherent plenum chamber as necessary "to convey gases in 38". Therefore, the rejection lacks sufficient clarity to allow Appellant to fully address the issues.

The Office further indicates that appellant's recited limitation of precursor inlets, precursor gases, purge gases and purge gas inlets are being treated by the Office as intended use rather than structural limitations and are considered not to limit the scope of the claims. The Office indicates reliance upon the *In re Walter* decision (618 F.2d at 769, 205 USPQ at 409) and MPEP § 2106; and upon the decisions in *In re Casey* (152 USPQ 235 (1967)), *In re Otto* (136 USPQ 458, 459 (1963)), and MPEP § 2111.02. Each of *Otto*, *Casey* and MPEP § 2111.02 pertain to uses recited in the claim preamble, and the effect to be given such recitations. Appellant notes that claim 14 clearly recites precursor inlets and purge gas inlets as structural limitation within the body of the claim. Accordingly, analysis of such limitations under *Otto*, *Casey*, and MPEP § 2111.02 is improper.

The *Walter* case, and MPEP § 2106 relied upon by the Office pertain to treating 35 U.S.C. § 112, sixth paragraph, and determination of equivalence for means-plus-function claims. Since claim 14 is not a means-plus-function claim, analysis under *Walter* is inappropriate. The Office's reading out of structural distinction between purge gas inlets and process chemical inlets is unfounded and rejection upon the cited grounds is improper. Appellant has repeatedly requested that if the Office's position regarding lack of structural limitation was to be maintained, appropriate supporting authority to be indicated to allow appellant to address the issue. No appropriate supporting authority has been provided.

The Office indicates reliance upon Srivastava as disclosing a gas flow inlet providing a venturi effect within a plenum chamber relative to other gas flow inlets. The Office goes as far as to indicate that the structure taught in the reference is substantially identical to that of the claims and therefore the venturi effect is presumed to be inherent (Action at page 3). This contention is entirely unsupported by the Srivastava disclosure. First, as discussed above, Srivastava fails to teach or suggest a plenum chamber. Second, since it is unclear as to what feature of Srivastava the Office considers to be a plenum chamber it is uncertain how the Srivastava gas feeds identified by the Office as being "on the body (10b)" of manifold 12, fairly qualify as being in fluid communication with the plenum chamber at distinct inlets as recited in claim 14. Srivastava entirely fails to disclose the claim 14 recited configuration of precursor feed streams and purge gas streams comprised by a manifold body and in fluid communication with a plenum chamber. The Office's holding of inherency of a venturi effect is therefore entirely unfounded.

Since Srivastava fails to disclose each and every feature of claim 14, such independent claim is not anticipated by the reference.

Claims 15-17 and 19-21 are allowable over Srivastava for at least the reason that they depend from allowable base claim 14.

Independent claim 31 recites a purge gas inlet into a plenum chamber which is upstream of plenum chamber precursor inlets. Claim 31 is not anticipated by Srivastava for at least reasons similar to those discussed above with respect to independent claim 14. Claim 31 additionally recites a plenum chamber outlet opposing the purge gas inlet where the body comprising the plenum chamber has a structure configured to mount the second end of the plenum chamber to a substrate processing chamber with the plenum chamber proximate to and connected with an inlet of the processing chamber. Referring to Srivastava Fig. 1b which is indicated by the Office as being relied upon, it is noted that gas box 12 is depicted as being configured for providing gas into a plasma tube 32b. Such does not in any way disclose Appellant's claim 31 recited plenum chamber outlet disposed at a second end proximate to and connected with an inlet of a substrate processing chamber. Accordingly, claim 31 is not anticipated by Srivastava and is allowable over this reference.

Dependent claims 32, 34 and 37-38 are allowable over Srivastava for at least the reason that they depend from allowable base claim 31.

**The rejection of dependent claims 18, 33 and 35-36, should be overturned since a *prima facie* case of obviousness has not been established.**

Claims 18, 33 and 35-36 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Srivastava in view of Onda (U.S. Patent No. 5,395,482). In accordance with MPEP §§ 2142 and 2143, a proper obviousness rejection has the following three requirements: 1) there must be some suggestion or motivation to modify or combine

reference teachings; 2) there must be a reasonable expectation of success; and 3) the combined references must teach or suggest all of the claim limitations. In order to establish a *prima facie* case of obviousness, each of these three factors must be shown, the burden of which is upon the Office (MPEP § 2142). Appellant respectfully submits that the Office has failed to meet this burden, no *prima facie* case has been established, and that claims 18, 33 and 35-36, are therefore allowable over Srivastava and Onda.

As set forth above, Srivastava fails to disclose each and every element in the independent claims 14 and 31. Further, the Srivastava disclosure does not suggest the claims 14 and 31 recited features including a plenum chamber, venturi effect, configuration of purge gas and precursor streams and outlets, or the recited combination of such features. With respect to claim 18 the Office indicates reliance upon Onda as disclosing a 3-way valve (Action at page 15 § xv). However, the disclosed 3-way valve of Onda does not in any way contribute toward suggesting the features of independent claim 14 which are neither taught nor suggested by Srivastava (discussed above). Accordingly, the requirement to show teaching or suggestion of each and every element of claim 14 has not been met and a *prima facie* case has not been established by the Office. Independent claim 14 is therefore allowable over the cited combination of Srivastava and Onda. Claim 18 is allowable for at least the reason that it depends from allowable base claim 14.

At pages 15-16 of the Action, the Office indicates reliance upon Onda as disclosing a flange and/or 3-way valves as recited in claims that depend from independent claim 31. However, disclosure of a flange or 3-way valves does not contribute toward suggesting the features of independent claim 31 which Srivastava fails to disclose or suggest (discussed above). Accordingly, independent claim 31 is not rendered obvious by the combination of Srivastava and Onda.

Since the Office has not shown that each and every feature of claim 31 is disclosed or suggested by the cited art combination, no *prima facie* case has been established relative to this claim. Dependent claims 33, 35 and 36 are allowable over the cited combination of Onda and Srivastava for at least the reason that they depend from allowable base claim 31.

**The rejection of independent claim 45, and dependent claims 46-61 should be overturned since a *prima facie* case of obviousness has not been established.**

Claims 45-61 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Srivastava and Onda. Independent claim 45 recites an elongate body comprising an elongate plenum chamber having a plurality of precursor inlets received along a longitudinal axis. Claim 45 further recites a purge gas inlet into the plenum chamber at a first longitudinal axis end which is upstream of all precursor inlets to the plenum chamber. As indicated above with respect to claims 14 and 31 the combination of Srivastava and Onda fails to disclose or suggest the recited plenum chamber or the recited feed streams on the body comprising the plenum chamber.

Claim 45 also recites that each of the precursor feed streams and purge gas stream comprises an elongated segment joining with its respective inlet, and that the purge gas stream elongated segment which joins with the purge gas inlet is substantially aligned on the longitudinal axis of the plenum chamber. At page 10-12 of the Action, the Office indicates reliance upon Srivastava as inherently disclosing a plenum chamber with a longitudinal axis, with such axis being identified by the Office as being the “axis of left-most piping 38 of 12” shown in Fig. 1b. The Office contends that elongated sections Srivastava's upper five feeds are normal to the longitudinal axis, while the elongate portion

of the sixth feed stream is substantially aligned on Srivastava's longitudinal axis. However, Fig 1b clearly depicts the referred to six feeds as being mutually parallel to one another. Accordingly, reliance upon Srivastava is in error as pertaining to this feature.

Nor does the Onda disclosure contribute toward suggesting the claim 45 recited precursor inlets having elongated segments oriented substantially normal relative to a longitudinal axis of a plenum chamber, and a purge gas stream having an elongated segment substantially aligned on the longitudinal axis of the plenum chamber.

Since the office has not shown that each and every element of claim 45 is taught or suggested by the cited combination of Srivastava and Onda, a *prima facie* case has not been established. Independent claim 45 is therefore not rendered obvious by the combination of Srivastava and Onda and is allowable over these references.

Dependent claims 46-61 are allowable over Srivastava and Onda for at least the reason that they depend from allowable base claim 45.

### Conclusions

For the reasons discussed above, claims 14-21, 31-38 and 45-61 are allowable over the art of record. In view of the forgoing, reversal of the final rejection of claims 14-21, 31-38 and 45-61 and formal allowance of such claims is respectfully requested.

Respectfully submitted,

Dated:

July 5, 2006

By:

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## VIII. CLAIMS APPENDIX.

Claims 14-21, 31-38 and 45-61, which stand finally rejected and are the basis of the present appeal, are presented below.

14. A reactive precursor feeding manifold assembly, comprising:

a body comprising a plenum chamber;

a first precursor feed stream on the body in fluid communication with the plenum chamber at a first precursor inlet to the plenum chamber;

a second precursor feed stream on the body in fluid communication with the plenum chamber at a second precursor inlet to the plenum chamber;

a purge gas stream on the body in fluid communication with the plenum chamber at a purge gas inlet to the plenum chamber which is upstream of both the first and the second plenum chamber precursor inlets and angled from the plenum chamber precursor inlets such that a purge-gas flow through the purge gas inlet provides a venturi effect within the plenum chamber relative to the first and second precursor inlets; and

the body comprising a plenum chamber outlet configured to connect with a substrate processing chamber.

15. The manifold assembly of claim 14 wherein the plenum chamber purge gas inlet is angled from the plenum chamber precursor inlets by from about 80° to 100°.

16. The manifold assembly of claim 14 wherein the plenum chamber purge gas inlet is angled from the plenum chamber precursor inlets by from about 89° to 91°.

17. The manifold assembly of claim 14 further comprising a first valve in the first precursor feed stream proximate the body, and a second valve in the second precursor feed stream proximate the body.

18. The manifold assembly of claim 14 further comprising a 3-way valve in the first precursor feed stream proximate the body.

19. The manifold assembly of claim 14 further comprising structure on the body configured to mount the body to a substrate processing chamber with the plenum chamber outlet proximate to and connected with a substrate processing chamber inlet.

20. The manifold assembly of claim 14 wherein the plenum chamber is longitudinally elongated having a longitudinal axis, the plenum chamber having a first longitudinal axis end and a second longitudinal axis end, the plenum chamber purge gas inlet being proximate the first end, the plenum chamber outlet being proximate the second end.

21. The manifold assembly of claim 20 wherein the plenum chamber purge gas inlet is on the longitudinal axis.

31. A reactive precursor feeding manifold assembly, comprising:

a body comprising a plenum chamber, the body having a first end and an opposing second end;

a plurality of precursor feed streams on the body in fluid communication with the plenum chamber at respective precursor inlets to the plenum chamber;

a purge gas stream on the body in fluid communication with the plenum chamber at a purge gas inlet to the plenum chamber which is proximate the first end and disposed upstream of the plenum chamber precursor inlets;

the body comprising a plenum chamber outlet disposed at the second end and configured to connect with a substrate processing chamber; and

structure on the body configured to mount the second end to a substrate processing chamber with the plenum chamber outlet proximate to and connected with a substrate processing chamber inlet.

32. The manifold assembly of claim 31 wherein the structure comprises a projection on the body.

33. The manifold assembly of claim 31 wherein the structure comprises a flange.

34. The manifold assembly of claim 31 further comprising a valve in the respective precursor feed streams proximate the body.

35. The manifold assembly of claim 31 further comprising a 3-way valve in the respective precursor feed streams proximate the body.

36. The manifold assembly of claim 31 further comprising a 3-way valve in the respective precursor feed streams proximate the body, one inlet to the 3-way valve being configured for connection with the respective precursor feed stream, another inlet to the 3-way valve being configured for connection with a purge gas line, the another inlet being upstream of the one inlet.

37. The manifold assembly of claim 31 wherein the plenum chamber is longitudinally elongated having a longitudinal axis, the plenum chamber having a first longitudinal axis end and a second longitudinal axis end, the plenum chamber purge gas inlet being proximate the first end, the plenum chamber outlet being proximate the second end.

38. The manifold assembly of claim 37 wherein the plenum chamber purge gas inlet is on the longitudinal axis.

45. A reactive precursor feeding manifold assembly, comprising:

an elongate body comprising an elongate plenum chamber, the plenum chamber having a longitudinal axis, the plenum chamber having a first longitudinal axis end and a second longitudinal axis end;

the plenum chamber comprising a plurality of precursor inlets received along the longitudinal axis;

respective precursor feed streams on the body feeding to the plenum chamber precursor inlets, the respective precursor feed streams including an elongated segment joining with its plenum chamber precursor inlet and which is oriented substantially normal to the longitudinal axis;

respective multi-inlet valves positioned proximate the body in the respective precursor feed streams, the respective multi-inlet valves having at least two valve inlets and at least one valve outlet, one of the valve inlets being configured for connection with a reactive precursor source, another of the valve inlets being configured for connection with a purge gas line;

a purge gas inlet to the plenum chamber at the first longitudinal axis end and upstream of all precursor inlets to the plenum chamber;

a purge gas stream on the body feeding to the purge gas inlet through a single-inlet valve, the purge gas stream including an elongated segment joining with the purge gas inlet and which is substantially aligned on the longitudinal axis; and

the body comprising a plenum chamber outlet at the second longitudinal axis end configured to connect with a substrate processing chamber.

46. The manifold assembly of claim 45 wherein the multi-inlet valves have only two inlets and only one outlet.

47. The manifold assembly of claim 45 wherein the another valve inlet is upstream of the one valve inlet.

48. The manifold assembly of claim 45 further comprising structure on the body configured to mount the body to a substrate processing chamber with the plenum chamber outlet proximate to and connected with a substrate processing chamber inlet.

49. The manifold assembly of claim 48 wherein the structure is configured to mount the body to a substrate processing chamber with the longitudinal axis being substantially vertical.

50. The manifold assembly of claim 48 wherein the structure comprises a projection on the body.

51. The manifold assembly of claim 48 wherein the structure comprises a flange.

52. The manifold assembly of claim 45 further comprising structure on the body configured to mount the body to a substrate processing chamber with the plenum chamber outlet proximate to and connected with a substrate processing chamber inlet, the respective multi-inlet valves when the body is so mounted being at least partially received within peripheral lateral confines of a chamber housing of the substrate processing chamber.

53. The manifold assembly of claim 52 wherein the multi-inlet valves when the body is so mounted are totally received within peripheral lateral confines of said chamber housing of the substrate processing chamber.

54. The manifold assembly of claim 45 wherein the plenum chamber purge gas inlet is on the longitudinal axis.

55. The manifold assembly of claim 45 wherein,  
the multi-inlet valves have only two inlets and only one outlet;  
the another valve inlet is upstream of the one valve inlet; and  
the plenum chamber purge gas inlet is on the longitudinal axis.

56. The manifold assembly of claim 55 further comprising structure on the body configured to mount the body to a substrate processing chamber with the plenum chamber outlet proximate to and connected with a substrate processing chamber inlet, and wherein the structure comprises a projection on the body.

57. The manifold assembly of claim 55 further comprising structure on the body configured to mount the body to a substrate processing chamber with the plenum chamber outlet proximate to and connected with a substrate processing chamber inlet, and wherein the structure comprises a flange.

58. The manifold assembly of claim 45 wherein,  
the multi-inlet valves have only two inlets and only one outlet;  
the another valve inlet is upstream of the one valve inlet; and  
further comprising structure on the body configured to mount the body to a substrate processing chamber with the plenum chamber outlet proximate to and connected with a substrate processing chamber inlet, the structure being configured to mount the body to a substrate processing chamber with the longitudinal axis being substantially vertical.

59. The manifold assembly of claim 58 wherein the structure comprises a projection on the body.

60. The manifold assembly of claim 58 wherein the structure comprises a flange.

61. The manifold assembly of claim 58 wherein the plenum chamber purge gas inlet is on the longitudinal axis.



## **IX. EVIDENCE APPENDIX.**

None entered.

## **X. RELATED PROCEEDINGS APPENDIX.**

No decisions entered.